

AMENDMENTS TO THE CLAIMS

1-19. (canceled)

20. (currently amended): A method to evaluate a candidate protocol or drug for treating a disease or disorder, which method comprises:

a) administering said protocol or drug to a non-human mammalian subject which expresses a fluorophore under the direction of a promoter of [[a]] an endogenous gene associated with said disease or disorder, and determining the expression of said gene via observing the presence, absence or intensity of the fluorescence generated by said fluorophore at various locations in said mammalian subject by whole-body external fluorescent optical imaging;

b) determining the expression of said gene, via observing the presence, absence or intensity of the fluorescence generated by said fluorophore at various locations in said mammalian subject by whole-body external fluorescent optical imaging, in a control non-human mammalian subject which expresses said fluorophore under the direction of said endogenous promoter of said gene; and

c) comparing the expression of said promoter determined in steps a) and b), wherein the expression determined in step a) is different from that in step b) identifies said protocol or drug as effective in treating the disease or disorder;

wherein said fluorophore is a protein that is autofluorescent such that no substrates or cofactors are needed for it to fluoresce.

21. (original): The method of claim 20, wherein overexpression of the gene is associated with the disease or disorder and the expression determined in step a) is lower than that in step b) when said protocol or drug is effective in treating the disease or disorder.

22. (original): The method of claim 20, wherein underexpression of the gene is associated with the disease or disorder and the expression determined in step a) is higher than that in step b) when said protocol or drug is effective in treating the infection.

23. (original): The method of claim 20, wherein the disease or disorder is selected from the group consisting of a cancer, an immune system disease or disorder, a metabolism disease or disorder, a muscle and bone disease or disorder, a nervous system disease or disorder, a signal disease or disorder and a transporter disease or disorder.

24-25. (canceled)

26. (original): The method of claim 20, wherein the non-human mammalian subject is selected from the group consisting of a mouse, a rat, a rabbit, a cat, a dog, a pig, a cow, an ox, a sheep, a goat, a horse, a monkey and a non-human primate.

27. (canceled)

28. (original): The method of claim 20, wherein the non-human mammalian subject is a transgenic animal.

29. (original): The method of claim 20, wherein the fluorophore is selected from the group consisting of a green fluorescent protein (GFP), a blue fluorescent protein (BFP) and a red fluorescent protein (RFP).

30-36. (canceled)

37. (currently amended): A method to screen for a modulator of the expression of a gene in a multi-cellular organism, which method comprises:

a) administering a test substance to a non-human multi-cellular organism which expresses a fluorophore under the direction of a promoter of [[a]] an endogenous gene, and determining the expression of said promoter via observing the presence, absence or intensity of the fluorescence generated by said fluorophore at various locations in said multi-cellular organism by whole-body external fluorescent optical imaging;

b) determining the expression of said endogenous promoter, via observing the presence, absence or intensity of the fluorescence generated by said fluorophore at various locations by

whole-body external fluorescent optical imaging, in a control multi-cellular organism which expresses said fluorophore under the direction of said promoter of said gene; and

c) comparing the expression of said promoter determined in steps a) and b), wherein the expression determined in step a) is different from that in step b) when said test substance modulates said gene expression;

wherein said fluorophore is a protein that is autofluorescent such that no substrates or cofactors are needed for it to fluoresce.

38. (canceled)

39. (currently amended): A method to screen for a multi-cellular organism that expresses a gene at an altered level, which method comprises:

a) administering a mutation-inducing agent or treatment to a non-human multi-cellular organism which expresses a fluorophore under the direction of a promoter of [[a]] an endogenous gene, and determining the expression of said promoter via observing the presence, absence or intensity of the fluorescence generated by said fluorophore at various locations in said multi-cellular organism by whole-body external fluorescent optical imaging;

b) determining the expression of said endogenous promoter, via observing the presence, absence or intensity of the fluorescence generated by said fluorophore at various locations by whole-body external fluorescent optical imaging, in an untreated control multi-cellular organism which expresses said fluorophore under the direction of said promoter of said gene; and

c) comparing the expression of said promoter determined in steps a) and b), wherein the expression determined in step a) is different from that in step b) when said multi-cellular organism expresses said gene at said altered level;

wherein said fluorophore is a protein that is autofluorescent such that no substrates or cofactors are needed for it to fluoresce.

40. (original): The method of claim 39, wherein the mutation-inducing agent or treatment causes a mutation in germ-line cells of the multi-cellular organism so that the mutation is stably-transferable to offspring of the multi-cellular organism.